

TO WHOM IT MAY CONCERN:

5 BE IT KNOWN THAT I, JOSEPH K. GARRETSON, a
citizen of the United States of America, residing in
Oxnard, in the County of Ventura, State of California,
have invented a new and useful improvement in

10 LOUDSPEAKER SOUND MODULATION APPLIANCE

BACKGROUND OF THE INVENTION

- This invention relates generally to accessories to loudspeakers, as for example are used in the instrument panels of vehicles, or for other purposes. More particularly it concerns a rotating element or spinner positioned in the path of sound waves produced by the speaker.

There is need for loudspeaker accessories characterized as producing motion to complement the sound, such as music, produced by such speakers.

SUMMARY OF THE INVENTION

It is a major object of the invention to provide a moving accessory meeting the above need, and which can be integrated with the speaker or its cabinet or housing.

In this regard, the invention is provided by:

- a) a spinner element mounted to rotate in the path of sound waves produced by the speaker diaphragm; and
- b) a rotary drive for rotating the spinner,
- c) the spinner defining sound wave passing

through openings, in said path.

As will be seen, the spinner may comprise a disc substantially spanning the sound wave path, to provide for sound wave modulation.

5 A further object is to provide a spinner that includes:

- i) a hub, and
- ii) spaced apart arms extending
 outwardly from said hub.

10 As will be seen the arms may have spaced apart extents between which the openings are formed.

 Another object is to provide the drive to comprise an electric motor positioned between said diaphragm and said spinner. The motor is typically
15 positioned between said diaphragm and said hub, and operatively connected to the hub. The motor is preferably carried by an interior support carried by a front plate defined by the loudspeaker assembly.

 An added object is to provide speaker arms
20 having varying widths along arm lengths which extend generally radially. The arms may typically rotate the spinner at a speed causing audible modulation of said sound waves passing through the openings, between the arms. The diaphragm of the speaker is typically a

woofer producing low frequency sound waves that are "chopped" by the spinner, the concave side of the woofer facing toward the spinner.

5 These and other objects and advantages of the invention, as well as the details of an illustrative embodiment, will be more fully understood from the following specification and drawings, in which:

DRAWING DESCRIPTION

10 Fig. 1 is a cutaway perspective view of a preferred device incorporating the invention;

 Fig. 2 is a top plan view of the Fig. 1 device;

15 Fig. 3 is a perspective exploded view of the spinner and of a positioning ring; and

 Fig. 4 is a perspective exploded view of the positioning ring, a mounting rim, and a loudspeaker diaphragm, as shown in Fig. 1.

DETAILED DESCRIPTION

20 In the drawings, a loudspeaker assembly 10 includes a box 11 having a front plate 12. The box may

comprise a housing for a speaker, as may be incorporated in or on a vehicle instrument panel.

Associated with plate 12 is a spinner 13 mounted to rotate in the path or paths (see arrows 14) of sound waves produced by a speaker diaphragm 15. A circuit to drive the diaphragm is indicated at 16, and an actuator mechanism at 17.

A rotary drive, such as an electric motor 20 is positioned, as between the diaphragm and spinner, to rotate the spinner. The drive housing 20a, is typically carried by a support 21, in the form of a stationary ring 21a peripherally carried at 22 by a mounting annular portion 12a of plate 12. The outer annular extent 15a of diaphragm 15 may also be carried by 12a. Annular portion 12a also carries an upstanding mounting ring 24 peripherally surrounded by the spinner, i.e. at outer edges of the spinner rim 13a.

Openings 26 are formed between the spaced apart arm 13b of the spinner, to pass sound waves produced by diaphragm 15 and directed through the spinner, which substantially spans, transversely, the path or paths of such waves 14. The arms 13b are preferably of widths which increase radially outwardly, as seen in Fig. 2. Narrow braces 29 interconnect

successive arms, at their lesser widths extents 13c,
outwardly of the spinner axis 13d of rotation, for
safety. See also non-rotating arms 133 projecting
generally radially and also forming openings 26a
outwardly of a fixed hub 134. The latter carries a
bearing 135 for the motor shaft 136 and sleeve 137,
which carries the spinner.

Fig. 1 shows drive shaft 136 projecting
upwardly into the spinner sleeve. Annular bearing 135
is positioned between the spinner hub sleeve 137, which
rotates, and hub 134 carried by the support 21.

In operation, the drive preferably rotates the
spinner at a speed causing audible modulation of said
sound waves passing through said openings between the
arms, as by chopping. Such modulation is enhanced by
the provision of the variable width spinner arms, as
described. Note also the diaphragm 15, preferably a
woofer, is generally concave toward the spinner. The
drive is generally centrally located at an axis defined
by the spinner, and supports the spinner for rotation,
the drive located between the spinner and diaphragm.

A control 100 may be operatively connected to
the motor 20, to vary its rotary speed, to vary the

sound wave modulation effect. Control 100 may be manually controllable.